The Scripps carbon dioxide and oxygen programs

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The Scripps CO_2 program was initiated in 1956 by Charles David Keeling and operated under his direction until his passing in 2005. It is currently being continued by Ralph F. Keeling, who also runs the parallel Scripps O_2 program. The combined programs are sustaining the longest continuous measurements of changes in atmospheric carbon dioxide concentration, the isotopes of CO_2, the atmospheric O_2 concentration (as O2/N2 ratio). The program involves flask collections made through cooperative programs with field stations at roughly a dozen stations around the world. The emphasis in the program is in the detection of global and hemispheric trends in these species.

The measurements are pertinent to assessing global and hemispheric sources and sinks of CO_2 and their changes from year to year. The records are also relevant source/sink estimates on finer spatial scales, and are among the first places to look for evidence of climate feedbacks or other "surprises" in the records.

For more than decade, the program has been archiving CO_2 from air samples in sealed glass ampoules for retrospective analysis. As an example of an application, these archives has recently allowed the generation of time series of the radiocarbon content of atmospheric CO_2, which is relevant for assessing the distribution of carbon between reservoirs and rates of fossil-fuel burning.

The O_2 program has also expanded recently to include measurements of the Ar concentration (as Ar/N_2 ratio). This ratio varies as the ocean warms and cools due to thermally-driven ingassing and outgassing of Ar and N_2 by the oceans. The long-term trend in Ar concentration is expected to be useful for assessing the global ocean warming rate.